

CLAIMS

1. A specimen position sensing, edge-gripping device that is adapted for operative coupling to a mechanism and gripping a specimen by its peripheral edge, comprising:

- a body having a support surface, a proximal end, and a distal end, the distal end including two spaced-apart distal projections;

- a light source operatively connected to the body and including a source light path opening and a light receiver including a receiver light path opening, the source light path opening and the receiver light path opening positioned at different ones of the two spaced-apart distal projections and dimensioned to form between the light path openings a light transmission pathway along which a light beam of known beam shape propagates from the light source to the light receiver, the light transmission pathway being of sufficient length to detect an interruption of the light beam caused by a specimen positioned in proximity to the body and within a predetermined distance relative to a spatial reference;

- a distal pad portion operatively connected to the body near the distal end at each of the distal projections to support the peripheral edge of the specimen and a distal backstop portion associated with the distal pad portion at each of the distal projections, the distal pad and distal backstop portions at each of the distal projections having respective distal pad and distal backstop specimen contacting surfaces that form a recess into which the peripheral edge of the specimen can be urged to grip the specimen; and

- a specimen contact mechanism that is actuatable between a specimen-releasing position and a specimen-securing position, the specimen-releasing position providing sufficient clearance for the specimen to rest on the distal pad specimen contacting surfaces and the specimen-securing position urging the peripheral edge of the specimen into the recess formed by the distal pad and distal backstop specimen contacting surfaces at each of the distal projections.

2. The specimen position sensing, edge-gripping device of claim 1, further comprising a proximal pad portion operatively coupled to the body near the proximal end to support the peripheral edge of the specimen, the proximal pad portion having a proximal pad specimen contacting surface on which to rest the peripheral edge of the specimen.

3. The specimen position sensing, edge-gripping device of claim 2, in which the specimen contact mechanism includes a proximal end contact point having a face portion that is inclined to impart to the specimen a motive force component directed toward the proximal pad specimen contacting surface.

4. The specimen position sensing, edge-gripping device of claim 2, in which each of the proximal and distal pad specimen contacting surfaces is made of a material that is different from the material of which the body is made.

5. The specimen position sensing, edge-gripping device of claim 4, in which the material of which each of the proximal and distal pad specimen contacting surfaces is made includes polyetheretherketone.

6. The specimen position sensing, edge-gripping device of claim 2, in which the proximal and distal pad portions are attached to the support surface.

7. The specimen position sensing, edge-gripping device of claim 2, in which the proximal and distal pad specimen contacting surfaces are inclined relative to the support surface.

8. The specimen position sensing, edge-gripping device of claim 2, in which the proximal pad specimen contacting surface is inclined in a direction relative to the support surface.

9. The specimen position sensing, edge-gripping device of claim 1, in which the distal pad and the distal backstop portions at each of the distal projections are associated such that they form a unitary structure.

10. The specimen position sensing, edge-gripping device of claim 1, in which the specimen is made of a particular material and in which each of the distal pad specimen contacting surfaces is made of a material that restricts to within acceptable limits for the particular specimen material the degree of contamination generated as the peripheral edge of the specimen is urged into the recess formed at each of the distal projections.

11. The specimen position sensing, edge-gripping device of claim 10, in which the material of which each of the distal pad specimen contacting surfaces is made includes polyetheretherketone.

12. The specimen position sensing, edge-gripping device of claim 1, in which the specimen contact mechanism is located nearer to the proximal end than to the distal end of the body.

13. The specimen position sensing, edge-gripping device of claim 1, in which the source light path opening and the receiver light path opening are positioned on the body farther from the proximal end than are the distal pad portions at the distal projections.

14. The specimen position sensing, edge-gripping device of claim 1, in which the distal pad specimen contacting surface at each distal projection is inclined in a direction relative to the support surface such that the peripheral edge of the specimen at rest on the distal pad specimen contacting surface moves away from the support surface in response to a motive force urging the peripheral edge of the specimen into the recess.

15. The specimen position sensing, edge-gripping device of claim 1, in which the distal backstop and distal pad specimen contacting surfaces at each distal projection form a generally perpendicular angle.

16. The specimen position sensing, edge-gripping device of claim 1, in which the specimen contact mechanism comprises a specimen contact actuator that includes a biasing device and a force applying device, the biasing device applying a biasing force to urge the specimen contact mechanism to the specimen-securing position and the force applying device selectively overcoming the biasing force to urge the specimen contact mechanism to the specimen-releasing position.

17. The specimen position sensing, edge-gripping device of claim 16, further comprising a position indicator operatively connected to the specimen contact actuator and operatively associated with a pair of spaced-apart reference position indicating devices, each reference position indicating device monitoring the movement of the specimen contact actuator to indicate a specimen-releasing limit position and a specimen-securing limit position with no specimen gripped.

18. The specimen position sensing, edge-gripping device of claim 1, in which the specimen contact mechanism comprises a specimen contact actuator that includes a biasing device applying a biasing force to cause the specimen contact mechanism to attain the specimen-securing position in the absence of facilities to operate the specimen contact mechanism.

19. The specimen position sensing, edge-gripping device of claim 18, in which the specimen contact actuator further includes a fluidic pressure-controlled device selectively overcoming the biasing force to cause the specimen contact mechanism to attain the specimen-releasing position.